PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Apparatus for Compacting Particulate Material in a Container

We, R. W. BARRACLOUGH LIMITED, a British Company and RONALD WILLIAM BARRACLOUGH, a British subject both of Manchester Road, Southport, Lancashire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to apparatus for compacting particulate material in a container and more particularly to apparatus for use in determining the volume of a given weight of such material.

In the filling of containers such as bins, bags or sacks with powdered or granular material it is known to jolt or otherwise agitate the container during the filling process in order to consolidate the material therein. A method used to produce such jolting may consist in repeatedly raising the container a small amount and allowing it to fall suddenly on to its original resting surface. A convenient means of achieving this movement is by the rotation of a suitably shaped cam upon which rests a supporting surface for the container.

In dealing with certain particulate materials, for example tea, a convenient criterion of quality is the bulk density of the material and it is frequently the case that a rough estimate of the value of a consignment of tea can be obtained by reference to the volume occupied by a given weight of tea. Moreover in packaging such particulate material, it is convenient to measure quantities separated from bulk by volume rather than by weight and where the size of the particles and other characteristics of the material may vary from batch to batch the relationship between volume and weight has to be established at the beginning of packing a batch in order to ensure the required degree of accuracy.

In both cases it is common practice to ascertain this weight/volume relationship by weighing out a quantity of material, transferring it to a graduated glass container and shaking down the material by vibrating the container, for instance, by bringing the base of the container into sharp and repeated contact with a flat surface such as a table top. The volume can then be read off the graduations of the container.

The results obtained by this method however are by no means consistently accurate since the degree of shaking down depends largely upon the person effecting the operation. Different people may use more or less force in vibrating the container and may do so a greater or lesser number of times before reading off.

It is the object of the invention to overcome this drawback and to secure results which are substantially uniformly accurate and to this end there is provided an apparatus which comprises a platform provided with means for securing the container thereto and supported for vertical movement, a cam device for causing said platform to be lifted slowly and to fall sharply, driving means for said cam device and control means operated by said driving means for enabling the lifting and falling of said platform to be effected a predetermined number of times.

The invention will be better understood from the following description of one embodiment which should be read in conjunction with the accompanying drawings comprising Fig. 1 and 2.

In the drawings:—

Fig. 1 shows a part sectional side elevation of the apparatus, while

Fig. 2 is a view also partly in section looking from the right-hand side of Fig. 1.

Referring to the drawings, the platform 10 is provided with two spring clips 11 for securing thereto the flanged base of a measuring glass or similar container. The platform 10 is mounted on a shaft 12 which is arranged for vertical movement in a hollow pillar 13. The pillar also forms a bearing for a shaft 14 which may be manually rotated by the handle 15 or may be driven from a source of power. The driving shaft 14 carries a double-lobed cam 16 which, as shown in Fig. 2, co-operates with the shaped end 17 of the shaft 12. The shaft 12 is also provided with a spindle 18 passing therethrough, the spindle moving in slots 19 provided in the pillar. Each end of the spindle is attached to a spring 20, the two springs being anchored at 21 to the base of the pillar. Also mounted on the driving shaft 14 is a pinion 22 which drives the toothed wheel 23 in a 6:1 gear ratio. The toothed wheel 23 carries a laterally extending pin 24 and a pin 25, secured to a lever 26, is arranged with the lever in the full line position shown in Fig. 2 to be located in the path of the pin 24. The lever 26 is pivoted at 28 on a bracket 29 integral with the pillar and is urged into the full line position shown in Fig. 2 by the spring 30 (Fig. 1). The toothed wheel, 23 is mounted on a second bracket 31 also integral with the pillar.

In operation, the given quantity of the material, for instance, tea is placed in the measuring jar which is secured to the platform 10 by the clips 11. The lever 26 is then depressed to its chain dotted position shown in Fig. 2 when the pin 25 moves out of the path of the pin 24. The driving shaft is now rotated and the lever 26 released. As the driving shaft is now rotated, it will be seen that the shaped end 17 of the shaft 12 will gradually rise on the surface of the cam 16 until the edge of the cam passes under the shaped end of the shaft. The shaft will then return sharply to the position shown in Fig. 2 under the action of the springs 20 and the tea will be shaken down in the measuring jar. At the same time the toothed wheel 23 will be rotated and since the gear ratio between the wheels 22 and 23 is 6:1 it will be seen that the measuring jar will be given twelve shakes before the pin 24 again engages with the pin 25 and further rotation of the driving shaft is prevented. In order to reduce the shock to the apparatus when the shaft 12 and the platform 10 fall, a rubber seating 32 is provided in the top of the pillar and is engaged by the boss 33 secured to the underside of the platform. Preferably the whole apparatus is enclosed within a casing 34, a slot 35 being provided for the lever 26.

It will thus be seen that the apparatus provides for uniform compacting of the tea or other material.

It will be understood that the apparatus described could be incorporated in a machine for separating measured quantities from bulk to ensure uniform shaking down of the material in the measuring container of the machine, if it is of the type employing a container from which the quantity of material is transferred to a packet, or to ensure uniform shaking down of the contents of successive packets if the machine is of the type in which the material is measured directly into packets.

Its main use however is in determining the volume of a given weight of material either as a guide to the quality of the material or, in packaging, in order that the required dimensions of the measuring container or the packet as the case may be, may be determined accurately before operation of the machine is commenced.

What we claim is:—

1. Apparatus for compacting particulate material in a container comprising a platform provided with means for securing the container thereto and supported for vertical movement, a cam device for causing said plaform to be lifted slowly and to fall sharply, driving means for said cam device and control means operated by said driving means for enabling the lifting and falling of said platform to be effected a predetermined number of times.

2. Apparatus as claimed in claim 1 in which a shaft secured centrally to the platform is arranged for vertical movement in a hollow pillar which also forms a bearing for a driving shaft to which a double-lobed cam is secured in such a position that the end of said first-mentioned shaft rides on the surface of the cam.

3. Apparatus as claimed in claim 2 in which said first-mentioned shaft is provided with a pair of oppositely-extending horizontally arranged rods which extend through slots in the pillar, the end of each rod being secured to a spring which is anchored to the base of the pillar.

4. Apparatus as claimed in claim 2 in which the driving shaft drives a reduction gear train having a ratio which is one half of the predetermined number of times the platform is to rise and fall, the last gear in the train forming part of the control means.

5. Apparatus as claimed in claim 4 in which the last gear in the train carries a pin and a lever pivoted to the pillar also carries a pin, the lever being spring-urged to a position such that the second-mentioned pin is in the path of movement of the first-mentioned pin, the engagement between the two pins serving to prevent further rotation of the driving shaft.

6. Apparatus as claimed in claim 5 in which the lever is capable of manual operation to cause the disengagement of the pin thereby enabling the driving shaft to be rotated.

7. Apparatus as claimed in any of the preceding claims in which the driving shaft is rotated manually.

8. Apparatus for compacting particulate material in a container substantially as described with reference to the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in or relating to Apparatus for Compacting Particulate Material in a Container

We, R. W. BARRACLOUGH LIMITED, a British Company and RONALD WILLIAM BARRACLOUGH, a British subject both of Manchester Road, Southport, Lancashire, do hereby declare this invention to be described in the following statement:—

The invention relates to apparatus for measuring predetermined quantities of particulate material and is more particularly concerned with means for determining the volume of a given weight of such material.

In dealing with certain particulate materials, for example tea, a convenient criterion of quality is the bulk density of the material and it is frequently the case that a rough estimate of the value of a consignment of tea can be obtained by reference to the volume occupied by a given weight of tea. Moreover in packaging such particulate material, it is convenient to measure quantities separated from bulk by volume rather than by weight and where the size of the particles and other characteristics of the material may vary from batch to batch the relationship between volume and weight has to be established at the beginning of packing a batch in order to ensure the required degree of accuracy.

In both cases it is common practice to ascertain this weight/volume relationship by weighing out a quantity of material, transferring it to a graduated glass container and shaking down the material by vibrating the container, for instance, by bringing the base of the container into sharp and repeated contact with a flat surface such s a table top. The volume can then be read off the graduations of the container.

The results obtained by this method however are by no means consistently accurate since the degree of shaking down depends largely upon the person effecting the operation, different people may use more or less force in vibrating the container and may do so a greater or lesser number of times before reading off.

It is the object of the invention to overcome this drawback and to secure results which are substantially uniformly accurate and to this end there is provided an apparatus which will shake down the contents of the graduated container to a uniform extent in each of a succession of operations thereof. Conveniently, where the apparatus is used in conjunction with packaging plant, the extent of shaking down may be made to agree with the extent experienced in the normal operation of measuring employed in a packaging machine.

An embodiment of the invention comprises a platform having retaining clips for the reception of the flanged base of a measuring glass and mounted on one end of a spindle projecting downwardly into a casing. Inside the casing the other end of the spindle engages the edge of a cam adapted to be rotated by a drive mechanism, the cam edge being so shaped that it raises the spindle to a predetermined extent and then permits it to fall back sharply, the cycle occurring one or more times in the course of a single revolution of the cam. The drive mechanism is provided with an automatic latching arrangement which is arranged to be released when a measuring operation is started and operates after a predetermined number of revolutions of the cam to prevent further rotation of the driving mechanism.

The drive may be a manual drive or a motor drive and in either case the latching arrangement may be controlled by a lever which upon being depressed releases the latch and permits the drive to become effective until the cam has rotated a set number of times whereupon the latch operates and locks the cam against further movement.

As an example of this arrangement the cam has two rises and falls in its surface and is driven through a 6.1 gear mechanism the driving pinion of which has a pin projecting therefrom adapted to engage a detent which is displaceable out of engagement with the pin by operation of a spring-restoring control lever. When this control lever is depressed the drive is effective for one revolution of the driving pinion whereupon the pin re-engages with the detent. This revolution of the driving pinion causes six revolution of the cam and thus twelve shakes of the container.

It will be understood that the apparatus described could be incorporated in a machine for separating measured quantities from bulk to ensure uniform shaking down of the material in the measuring container of the machine, if it is of the type employing a container from which the quantity of material is transferred to a packet, or to ensure uniform shaking down of the contents of successive packets if the machine is of the type in which the material is measured directly into packets. Its main use however is in determining the volume of a given weight of material either as a guide to the quality of the material or, in packaging, in order that the required dimensions of the measuring container or the packet as the case may be, may be determined accurately before operation of the machine is commenced.

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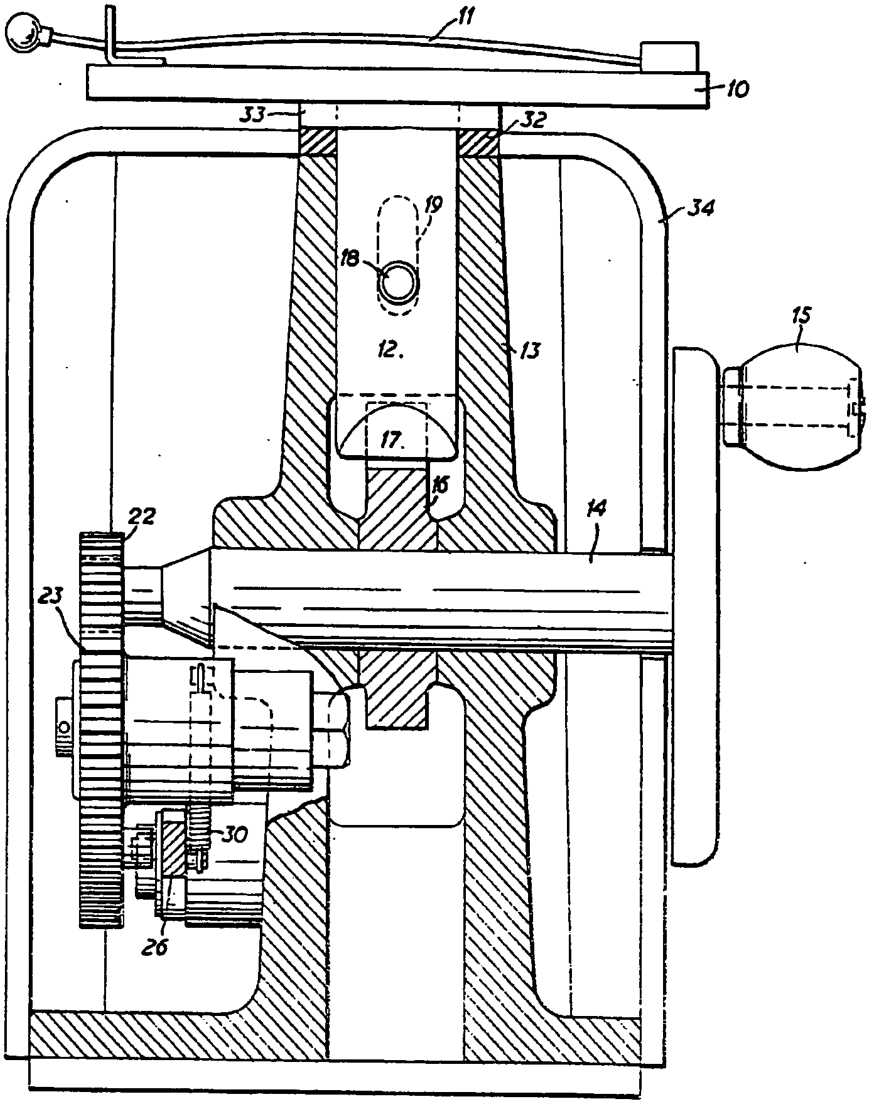

FIG. 1

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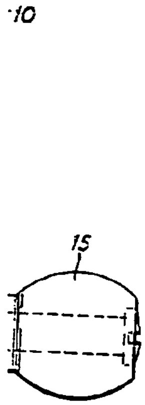
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 1 & 2



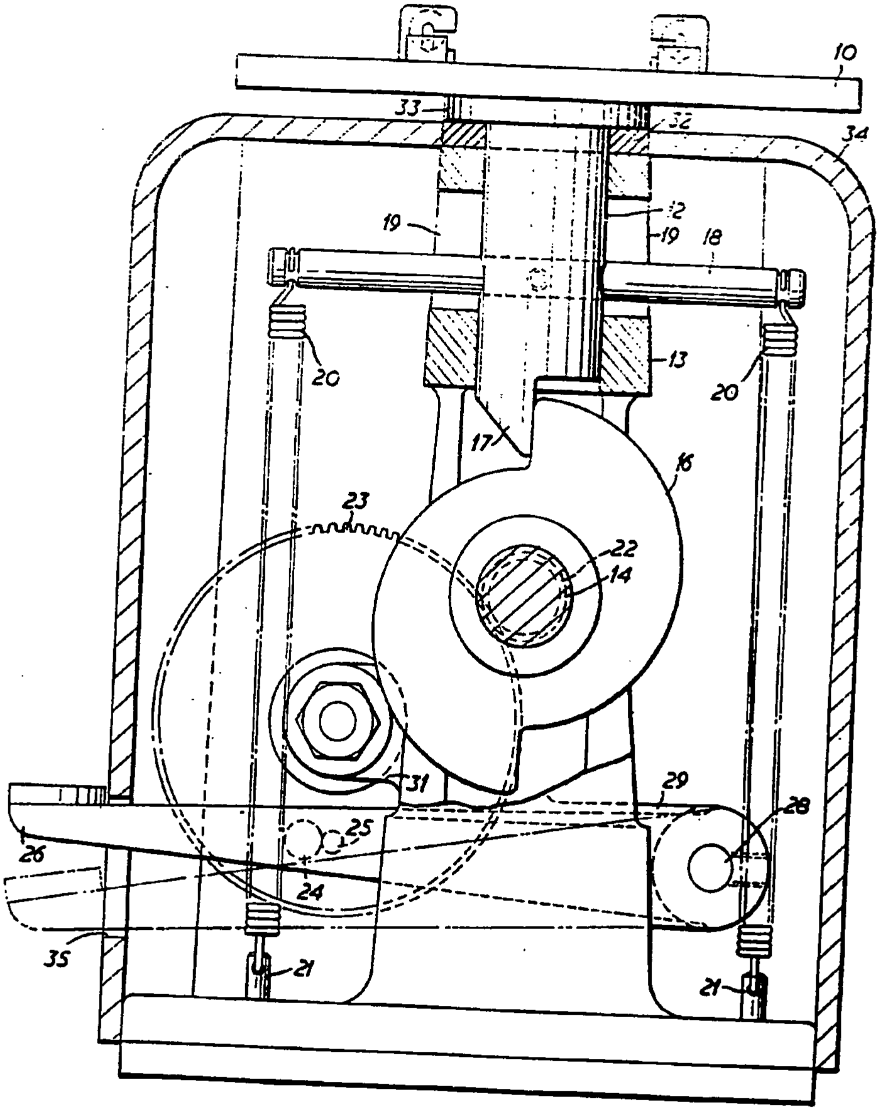


FIG. 2

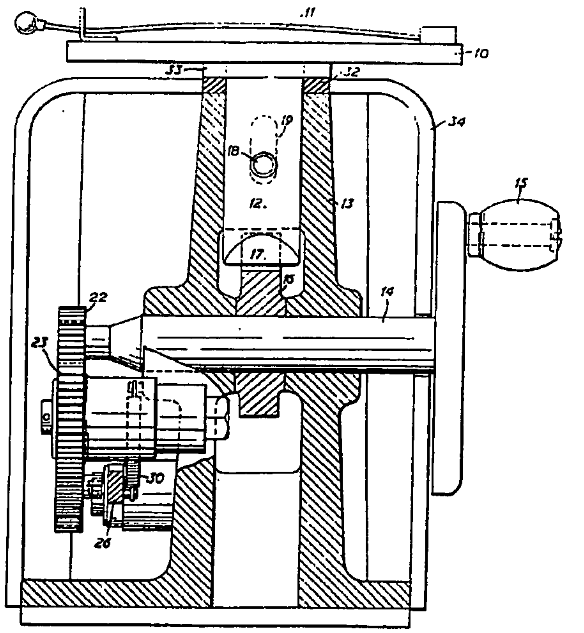

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FIG. 1

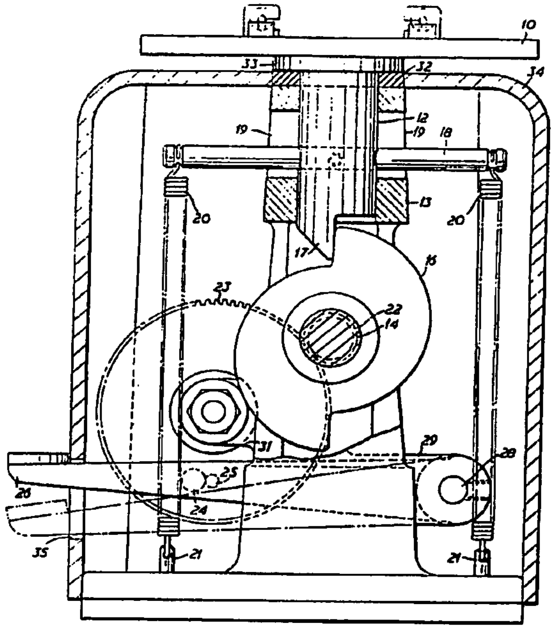

FIG. 2